Climate Change Adaptation Strategy for Built and Archaeological Heritage

An Roinn Cultúir, Oidhreachta agus Gaeltachta
Department of Culture, Heritage and the Gaeltacht

Stakeholder Workshop 2

Wednesday, 23 January 2019

Dublin

University of Lincoln

Carrig Conservation International 25 Years

IGBC Irish Green Building Council

ABOUT

The Department of Communications, Climate Actions and the Environment recently published Ireland's first statutory National Adaptation Framework. Under the framework, the Department of Culture, Heritage and the Gaeltacht (DCHG) is one of 12 sectors required to prepare a sectoral adaptation plan to increase Ireland's resilience to climate change. Carrig Conservation, the University of Lincoln and the Irish Green Building Council are now working in close cooperation with the DCHG to develop Ireland's first 'Climate Change Adaptation Sectoral Plan for Built and Archaeological Heritage'.

The objective of the stakeholder workshops was to discuss the potential impacts of climate change on Ireland's built and archaeological heritage, and prioritise the short- and long-term adaptation actions needed—A copy of the full running order is available here and the presentations can be downloaded here. The feedback collected from the workshops will directly inform the development of the sectoral plan. The draft plan will be widely circulated through a public consultation scheduled for May 2019.

The project team would like to thank all participants who attended and contributed to the workshop. These are listed here.

SUMMARY

Over 60 people took part in the second workshop organised in Dublin to collect feedback on the development of Ireland's first "Climate Change Adaptation Sectoral Plan for Built and Archaeological Heritage". While a significant number of case studies were collected on the day (see Q1), the key findings of the day were as follows:

Key findings

- Workshop participants highlighted that most of Ireland's built and archaeological heritage is located in low-lying areas on the coasts.
- Unsurprisingly, the impacts of extreme events - torrential rains, increased flooding, stronger storms, and enhanced rates of coastal erosion were of most concern to them.
- A significant proportion of workshop participants expressed concern at the cumulative impact of more frequent and intense weather events.
- Other key sources of concern included:

  - Increase in relative humidity and temperatures, leading to faster plant and mould growth, and in creased or new pest infestation, which could, damage historic buildings;

  - Poorly considered and implemented deep retrofit of historic buildings;

  - Poorly considered and implemented flood protection plans.

- Interestingly, many workshop participants said that they were mainly concerned by the combination and interaction of these impacts.
- A number of actions were suggested to better protect Ireland's built and archaeological heritage:

  - Develop quality data, including guidelines and case studies, and make them freely available.

  - Take a holistic, multi-disciplinary approach to the development of actions and plans to address the impacts of climate change.

  - Increase funding and resources for research and maintenance.

  - Raise awareness about the impact of climate change on our built and archaeological heritage across society.

  - Make sure we have the right skills, including traditional building skills, to protect our heritage as sets.

Q.1 & 2 What do you see as the main vulnerability of Ireland's built and archaeological heritage to the impacts of climate change? Can you give some examples of impacts on the built and/or archaeological heritage in your region which you believe may be due to climate change?

The objective of the first two questions was to gain a better understanding of workshop participants' key concerns in relation to the impacts of climate change on the built and archaeological heritage and to collect case studies.

Most of Ireland's built and archaeological heritage is located in low-lying areas on the coasts. Workshop participants were mainly concerned about the impact of storms, torrential rain, flood events and coastal erosion. A significant proportion of them participants also expressed concern about the cumulative impacts of more frequent and intense events.

Other key sources of concern included an increase in relative humidity and temperatures, as well as inappropriate deep retrofit and inadequate flood protection works having a negative impact on historic buildings.

Direct impacts

- **Catastrophic**

Most workshop's participants expressed concern about the greater frequency, magnitude, fluctuation and duration of extreme weather events, including flooding, torrential rainfall, storms, frost and draught.

The rainwater goods and drainage systems of many historic buildings are not designed to cope with **extreme rainfall**. E.g. inadequate soakage in Stoneybatter. Intense rainfalls impact the stability of the soil and building foundations, and can saturate building fabric leading to increased dampness and the washing out of pointing, mortars and plaster. Increased movement of rain through ruined structures can lead to the rapid deterioration of loose core materials, and potentially to buildings collapsing. Water penetration also damages collections, historic interiors and archaeological sites.

Examples of **storms and strong winds** impacting the built and archaeological heritage include:

- Damages to roofs and structures of buildings. E.g. Collapsing walls at St. Columbas College;
- Mature trees falling on protected structures;
- Damages to Howth harbour, Howth lighthouse, Dun Laoghaire pier, and Bullock Harbour during Storm Emma. All damages were accentuated by the higher waves recorded in Dublin bay in the last few years;
- Impact on sea floor and underwater archaeology. E.g. RMS Leinster and other shipwrecks.

A significant proportion of participants expressed concern about the potential impacts of **flash flooding** on historic buildings, including in Dublin city centre. Built and archaeological heritage may be partly or fully flashed away. Flash flooding can also have significant impacts on building fabric.

Examples of the impacts of **torrential rains and flood events** on the built and archaeological heritage given included:

- Damages to sea front buildings. e.g. Lahinch;
- Ingress of rainwater into buildings has become more common with heavy precipitation and change in wind direction, leading to damp in new places. e.g. St Patrick's Cathedral in Armagh;
- Flooding along Clontarf and Sandymount coastlines, as well as tidal intrusion where it did not occur before. e.g. River Liffey;
- Loss of historic bridges due to flooding e.g. Claudy Bridge;
- Damages to historic bridges during flooding episodes e.g. Graiguenamanagh bridge;
- Flooding at Glucksman Gallery in Cork in 2009;
- Collapse of retaining wells –e.g. Cobh;
- Landslides following torrential rains –e.g. Skellig Michael and Howth graveyard.

The impact of extreme hot and cold weather on the built and archaeological heritage was also mentioned. Frost and drought can both have an impact on the structural integrity and physical surroundings of our built and archaeological heritage. High temperature variations can also cause structural weakness in heritage, e.g. lime mortars and plasters need a relatively stable environment.

The 2018 **heat wave** brought about the discovery of subsurface and underwater archaeology, e.g. Brú na Bóinne. The heat wave also led to the collapse of Oregon maples in Trinity College Dublin. Although the trees are not built heritage, they were clearly part of the "heritage" landscape of the campus. Over-drying of timbers also led to the collapse of walls on Hume Street.

Cold spells can significantly damage historic buildings thought - snow loading, on roofs, the spalling of brickwork and stonework and the shattering of cast iron.

Finally, one workshop participant said that his biggest concern was the successive combination of extreme events when heritage protection resources have not been sufficient to respond to the impacts of the first event.

- **Cumulative**

Workshop participants highlighted that most of Ireland's built and archaeological heritage is located in low-lying areas on the coasts. Unsurprisingly, the impacts of **coastal erosion** and of **rising sea level** were of most concern to them.

Coastal erosion and sea level rise can undermine the foundations of old structures and buried grounds. Examples given include Ballinskelligs Castle, Rossbeigh dunes, Portrane Co. Fingal, Skellig Michael, Dunbeg Fort, and the Harbour walls in Howth and along the Great South Wall Walk in Dublin. One workshop participant said that much of the Victorian housing stock is located very close to sea level, e.g. Brighton Vale in Monkstown.

A number of other cumulative impacts were mentioned, including an increase in relative humidity and temperatures which could, potentially lead to **increased mould growth and pest infestations**, and greater damage to natural building materials. It can also lead to more vigorous growth of ivy and climbers in gutters, hopper heads and joints. Warmer winters have caused ever greater issues for museums. Drier summers and warmed winters have also cause the trees to keep their leaves longer, which causes their roots to dry out and makes them far more likely to fall over during strong winds.

Higher rainfall can also lead to increase loss of detail on carved stone. e.g. high crosses.

Finally, air and water pollution can often damage buildings even further.

Indirect impacts

♦ Mitigation

A high proportion of workshop participants expressed concern about **inappropriate retrofits** of historic buildings: Works to improve the thermal efficiency of historic buildings can exacerbate mould issues associated with higher humidity if non-vapour permeable (non-breathable) materials are used.

It can also impact the character of a building. For instance, the replacement of traditional historic timber sash windows by plastic double-glazed units, results in a degradation of the special architectural significance of a building - E.g. Corrig avenue, Dun Laoghaire. External insulation of non-listed historic buildings can also lead to loss of character.

Two workshop participants also said that solar panels have a negative impact on the character of historic buildings.

♦ Adaptation

Many workshop participants expressed concern about a **purely engineered (grey) approach to flood defence works** - e-g. flood walls on the River Dodder. The impact of flood defences on heritage in Clonmel, Clonakilty and Skibbereen was also mentioned.

A number of workshop participants said that **interesting public housing was being demolished because the deep retrofit of these buildings was perceived as too costly**.

Both of these adaptation measures have a high carbon cost — life cycle assessment should be employed regularly to lead to joined up thinking and to find the most sustainable solution.

Examples of inadequate erosion mitigation measures were also given. This included the use of unattractive boulders being placed on historic seaside areas of Dun Laoghaire to prevent coastal erosion, i.e. Scotsman's Bay and the Dun Laoghaire pier.

The poor quality of some measures taken to "hold" a vacant/ derelict historic building was also mentioned - e.g. tarpaulin roofs to hold thatched roofs and loose slates in place, cement pointing on popped brickworks, etc...

Finally, two workshop participants talked about the **impacts of land-use change on heritage**. One said that land-use change is likely to impact on unknown heritage. Another feared that the installation of solar and wind farms' would lead to loss of land that could be used to grow historic building mats e.g. thatching straw.

Many workshop participants were **mainly concerned with the combination and interaction of these impacts**. The impacts will be further accentuated by increased tourism and by the fact that many historic buildings are not well maintained. This may become an even bigger issue in the future as owners of historic properties located in flood zones won't be able to get flood insurance.

Q.3 Have you been involved in any actions and/or plans intended to address climate impacts on built and/or archaeological heritage? If so, would you say it was easy? What is required to make that process easier?

Approximately two-thirds of the workshop participants had been involved in an some form of action or plan intended to address the impact of climate on built and/or archaeological heritage prior to the event. Those involved in these type of actions had a wide variety of experience, from working on flood defence programmes to drafting policies and legislation.

Many of those involved felt that working on this type of action or plan was challenging. Key difficulties identified include:

- Lack of resources, in particular for prompt responses following catastrophic events
- Lack of awareness - Protecting the built and archaeological heritage is rarely seen as a priority
- Lack of baseline data
- Lak of multidisciplinary approach
- Lack of joined-up thinking, including internally within each local authority.

What is required to make the process easier?

♦ **Funding and resources**

Participants felt that funding is required for research, and more specifically for multidisciplinary, evidence based studies to make a case for protection and conservation of historic buildings. More funding is also needed for regular maintenance of protected structures, including those in private ownership.

In relation to retrofits, SEAI grants should fund works that are appropriate for historic buildings.

As the level of funding required will need to increase over the next decades, the government should look at innovative funding models. However, all information on funding readily available and easy for people to find. Participants suggested that- a single webpage listing all available funding schemes be created. Participants acknowledged that it is unrealistic to expect the government to do everything, but government should provide better support for NGOs and local groups willing to protect the built and archaeological heritage.

♦ **Quality data**

Quality data must be gathered and must be made freely available. Participants felt a central repository of information would be useful.

Better recording and classification of heritage assets is required: Participants felt we need to better understand what is in our portfolio, including in private ownership.

Climate scenarios for 2030, 2040 and 2050 are needed so that everybody is working on same challenge and can think strategically to meet goals. GIS layers (including OPW flood maps and RPS data) could be used to determine sites at risk and to prioritise actions.

Better monitoring (e.g. impacts of storms on the sea floor, erosion of fabric, etc...) and recording of data is required. Involving NGOs and local communities in monitoring could raise awareness of these issues and improve data quality.

Finally, guidelines and case studies should be developed to support decision making. Resources developed in other jurisdictions may be adapted to suit our needs. EPA or SEAI research calls could also be used to develop quality case studies.

♦ Providing long-term certainty

Many workshop participants felt that the protection of built and archaeological heritage is often not perceived as a priority. Ambitious policies must be formulated so that actions are followed through. Heritage isn't a strong focus in Local Authority Climate Change Adaptation Plans. In fact, it seems that very few heritage employees have been involved in their development to-date. For this to happen, senior level buy-in i.e. at CEO level is required.

♦ A multidisciplinary, holistic approach

A more inclusive, multidisciplinary approach is required to develop actions and plans to address the impact of climate change.

In particular, engineers, urban designers, ecologists heritage and conservation officers should all be involved from the very beginning in developing flood prevention plans. With that regard change to the Arterial Drainage Act 1945 seems critical, as it fails to involve all relevant disciplines at concept stage.

A more holistic approach would also be helpful in dealing with erosion, e.g. through the use of mixed aged strands of trees.

Many local authorities find it difficult to justify large –scale renovation (as opposed to demolition) of older public housing as it can add up to 30% to cost. However, a holistic method for cost-benefit analysis (including energy efficiency, historic value of the buildings, embodied carbon, etc.) could help justify it.

Generally speaking, more holistic approaches to the protection of valuable heritage sites, including cost-benefit assessment of actions would be useful.

♦ Awareness raising and higher communities' engagement

The government need to better communicate climate change issues to a wider audience e.g. to the general public, building professionals, contractors and local authority officials.

The general public needs to gain a better understanding of the potential impacts of climate change on the built and archaeological heritage. Information about these impacts could potentially be displayed at historic site visitor centres. Local community groups could get involved in monitoring the impacts on these structures and sites. There are 10,000 protected structures in Dublin alone and many of them are in private ownership. Owners need to understand the vulnerability of their buildings. One workshop participant explained that the Irish Georgian Society, the Department of Culture, Heritage and the Gaeltacht and 10 local authorities ran seminars for homeowners on energy efficiency in historic buildings in 2009 and asked whether this could this be organised on an annual basis, perhaps, with support from the SEAI.

♦ Skills and competences

Building professionals, local authorities and contractors need to learn to design and build for resilience. In fact, participants felt this should be part of the training for planners, contractors, building professionals and specifiers'. One workshop participant suggested to re-run the "Blue shield course on emergency response for heritage" at a much larger scale in 2019. Local authority staff and professionals also need continuous training so that they are ready to act when extreme events happen.

With regard to retrofit, building professionals and tradesmen need to understand that historic buildings work differently from modern buildings, and must be able to advise building owners on the same. Furthermore, more money should probably be invested in traditional skills.

Who else should be part of this conversation?

Which idea would you like to make sure we do not forget?

We need to spend €6 billion per year on Climate Change. When are we going to start?

Need to focus on developing a joined-up approach to upstream fluvial and tidal strategies

Flood defence carbon footprint should always be assessed. We don't want our adaptation strategy contributing to climate change.

All our efforts should be coordinated

Need more open up discussion on the impacts of climate change at all levels of society

Include information on the economic impact of damages due to extreme weather events

Reduce pressure on citizens when they try to do the right things. This leads to inaction.

Don't wait for all the base work to be completed to develop guidance for owners and key stakeholders. We need to act now.

It might be cheaper to demolish and rebuild in short term but it's more expensive when considered holistically

We must design for future resilience now

Highlight built heritage climate change issues using high profile monuments and case studies.

Focus on awareness raising, ensure that everyone understand how they can contribute to mitigating climate change, avoid poor retrofit and to protect our built heritage.

Coordination of efforts, adequate funding and timeframe to complete heritage projects that need the most attention and will have the greatest net benefit nationally.

Consult, educate, disseminate.

Attribute financial value to heritage.

Get communities involved. If they better understand the local heritage properties they have, they will be better able to preserve, protect and avoid damaging them.

Use statistics on the impact of climate change on historic buildings, not just case studies

How urgent it is to inform our society about how important it is to act to mitigate and adapt to climate change

Multi-disciplinary teams are needed to assess climate impacts across sectors. Engineers can't solve this one alone

Careful, sensitive intervention into historic buildings

Funding to raise awareness among the public (estate agents, planners, architects, citizens) to explain best energy efficiency practice for traditionally built buildings

THANK YOU TO ALL OUR PARTICIPANTS

GET INVOLVED

For further information on this project, please contact Marion@igbc.ie.